COMP 422
Parallel Computing
Spring 2015
Syllabus

- **Course Title:** Parallel Computing
- **Time and Place:** TTh 1:00pm-2:15pm, 1075 Duncan Hall
- **Instructor:** John Mellor-Crummey
  - Email: johnmc@rice.edu
  - Office: 3082 Duncan Hall, x5179
  - Office Hours: 8:30-9:30am Wednesday and by appointment

- **Teaching Assistants**:
  - Sri Raj Paul
    - Email: srp7@rice.edu
    - Office: 3064 Duncan Hall
    - Office hours: 4:00-5:00pm Tuesday and Friday
  - Lai Wei
    - Email: lai.wei@rice.edu
    - Office: 3111 Duncan Hall
    - Office hours: 2:30-3:30pm Monday and Thursday

- **Class Website:** http://www.clear.rice.edu/comp422

- **Textbook:** *Introduction to Parallel Computing, Second Edition*, Ananth Grama, George Karypis, Vipin Kumar, Anshul Gupta, Addison-Wesley, 2003, ISBN: 0201648652 (Recommended, but not required)

- **Topics**
  - Principles of parallel algorithm design
    - decomposition techniques
    - mapping & scheduling computation
    - templates
  - Programming shared-address space systems
    - Cilk Plus
    - OpenMP
    - Pthreads
  - Parallel computer architectures
    - shared memory systems and cache coherence
    - distributed-memory systems
    - interconnection networks and routing
  - Programming scalable systems
    - message passing: MPI
    - global address space languages
  - Analytical modeling of program performance
    - speedup, efficiency, scalability

        - cost optimality
        - isoefficiency
    - Collective communication
    - Synchronization
    - Non-numerical algorithms
        - sorting
        - graphs
        - dynamic programming
    - Numerical algorithms
        - dense matrix algorithms
        - sparse matrix algorithms
    - Performance measurement and analysis of parallel programs
    - GPU Programming
    - Problem solving on clusters using MapReduce

- **Evaluation:** Coursework will be weighted as follows:
    - Programming Assignments 95%
    - Class participation 5%

- **Class Participation**

  Students are expected to attend lectures and are encouraged to ask questions.

- **Programming Assignments**

  There will be four programming assignments in the semester. Programming assignments are to be done individually. You may discuss assignments with others, but you must code your own solutions and submit them with a write-up in your own words. Indicate clearly the name(s) of student(s) you collaborated with, if any. Although homework assignments will not be pledged, per se, the submitted solutions must be your work and not copied from other students' assignments or other sources. See the section on Misconduct for details about what is prohibited.

- **Communication**

  COMP 422 will use a moderated discussion group on www.piazza.com for day-to-day communication. The class piazza page can be found here: https://piazza.com/rice/spring2015/comp422/home. If you have a technical question about a programming assignment, parallel systems, or anything else related to the course, please post it to the discussion group rather than sending it directly to the instructor or a TA. This will enable everyone in the class to benefit from questions and answers. Only inquires of a personal nature should be made directly to the instructor or TAs.

  Any email sent directly to a TA or instructor should include "COMP 422" in the subject line to avoid having it overlooked amidst a torrent of incoming email.

- **Policy on Late Work**

  I recognize that you have other demands on your time besides COMP 422 programming assignments. As a result, you will have a total of 7 "slip days" throughout the semester that you can use at your discretion to turn in programming assignments past the posted deadline. Slip days are used in whole day increments. Once your slip days are consumed, late programming assignments will be penalized at 10% per day.

- **Misconduct**

  You may not transmit or receive code from anyone in the class in any way--visually (by showing someone your code), electronically (by emailing, posting, or otherwise sending someone your code), verbally (by reading your code to someone), or in any other way.

  You may not collaborate with people who are not your classmates, TAs, or instructor in any way. For example, you may not post questions to programming forums. Submitting requests for help using Rice computing facilities, e.g., the batch queues, to the RCSG is allowed.

  You may search the web and use any information that you find. However, you cannot take more than two lines of code from an external resource and actually include it in one of your assignments. Changing variable names or rewriting code you find does not void the "two line rule."

  Any violations of these rules will be reported to the honor council.

- **Accommodations**

  If you have a documented disability that will impact your work in this class, please contact me during the first two weeks of the semester to discuss your needs. All discussions will remain confidential. Additionally, you will need to register with Disability Support Services in the Allen Center.

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13 January 2015 - created.
15 January 2015 - added link to course page on piazza.
27 January 2015 - added TA office hours.